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Minutes: ISO TC184/SC4/WG10 workshop on SC4 data architecture

Charleston SC, USA, 1998-11-16/18

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This document is also available in Adobe Acrobat (PDF) format.

Introduction

The first half of WG10's meeting in Charleston was dedicated to a workshop on the Preliminary Work Item on SC4 Data Architecture. Participants in the workshop were:

Julian Fowler	PDT Solutions	UK
Jochen Haenisch	DNV	Norway
Yoshihito Kikuchi	Hokkai-Gakuen Univ.	Japan
Kazuo Ohkoshi	JECALS/JSTEP	Japan
Yasumasa Oku	JECALS/JSTEP	Japan
David Price	IBM	USA
Dave Sanford	The Boeing Company	USA
Greg Smith	The Boeing Company	USA
Günter Staub	RPK	Germany
Bernd Wenzel	EuroSTEP	Germany
Matthew West	Shell Services International	UK

The agenda distributed in advance of the meeting was reviewed. Matthew West suggested that links to WG12 need to be added to the agenda. Dave Sanford asked that the walkthrough of the integration model should include worked examples. The agenda as listed below corresponds to the actual meeting activities, and serves as a table of contents for these minutes.

1. Status of the Preliminary Work Item project
    - Reports from the Oslo and Beijing meetings
    - Progress against the work plan
2. Discuss comments against "The STEP Data Integration Architecture Activity" (David Price, WG10 N196)
3. Discuss comments against "Integration of Industrial Data for Exchange Access and Sharing: A Proposed Architecture" (Matthew West, WG10 N195)
4. Walkthrough and review "Foundation for an Integration Model" (Matthew West, WG10 N197)
5. Presentation: Introduction to Terminology
6. Integration Meta Model and Notation
7. Worked example(s)

8. Plan and discuss the demonstration of the architecture (Task 3 on the workplan)
9. Update project plan, schedule, resources, and task leaders
    - Requirements on EXPRESS-2 and EXPRESS-X
    - Demonstration
    - Architecture requirements
    - NWI proposals
10. Complete walkthrough of the integration model
11. Integrating the results of the Oslo workshop with N197
12. Next steps and assignment of actions
13. Requirements for future meetings
14. Any other business
15. Close

Status of the Preliminary Work Item project

Report from the Oslo meeting (August 1998)

Julian Fowler gave a summary of the Oslo meeting (see minutes, WG10 N193). Although the meeting itself had been successful, few of the actions assigned have been carried out. It was agreed that these actions need to be reviewed in the context of reviewing and revising the PWI work plan.

Report from the Beijing meeting (October 1998)

Matthew West reported on the Beijing meeting. There were no specific WG10 discussions on this topic. The main activity was a presentation and discussion of the PWI proposals to WG12, based on WG10 N195.

Jochen Haenisch noted that there had been considerable discussion over email exploders between Oslo and Beijing. Matthew West stated that there had been two main topics: the requirements on EXPRESS, and the nature of a data integrationarchitecture. Bernd Wenzel reported that he had discussed the EXPRESS requirements with Phil Spiby; some of the requirements may not be addressed in EXPRESS version 2, and may be deferred to EXPRESS version 3.

David Price expressed concern that meetings were taking place with other WGs at a time when WG10 itself does not have a full understanding or concensus with respect to the data integration architecture. Matthew West stated that the focus of the discussions had been on gathering requirements. On the EXPRESS issue, it was agreed that WG10 needs to gain a better understanding of these requirements before they are formally submitted to WG11.

Work plan

Matthew West showed an updated version of the project plan (see WG10 N187). Status of tasks is as follows.

- **Produce statement of requirements**: WG10 N173 is the final output of this task. Julian Fowler stated that only two sets of comments had been received from the SC4 review, and that neither demanded a further revision to the document.
- **Produce technical overview**: WG10 N195 is the latest version of this deliverable. Some further revision is expected before the task is complete.
- **Demonstration of the architecture**: this task is behind schedule, and is to be discussed later in the workshop.
- **Enhancements to EXPRESS/EXPRESS-X**: this task is also behind schedule, and as noted above there is a lack of understanding/consensus within WG10. Matthew West stated that he would work on reformulating the requirements, prior to further discussions with WG11 at the San Francisco meeting.

Action: Matthew West

- **Detailed Architecture Specification**: WG10 N195 contains the latest version of this component of the PWI.
- **Methodology Specification**: No specific documents have been produced to date (work is scheduled to

start in 1999)
- **Initial Integration Model**: WG10 N197 is the initial draft of this deliverable.

David Price noted that there is no task to document the impact of the data architecture on the rest of SC4. It was agreed that a Transition Plan should be developed as an additional deliverable of the PWI project. Dave Sanford asked whether there would be any equivalent of the OMG's approach that any proposal (new standard) should conform to a strictly formulated set of rules. Bernd Wenzel suggested that it was very important that the new architecture should not be deployed before the approach is mature, validated, and documented.

Discuss comments against "The STEP Data Integration Architecture Activity"

David Price explained that this paper (WG10 N196) had been developed as a summary of several previous WG10 papers as input to an SGML/XML conference in Montreal. Matthew West noted that in spite of the N-number sequence N196 precedes, and does not fully reflect the content of, WG10 N195. David Price stated that this had not been intended to be a working paper of WG10, and that there was no plan to update or revise it.

Dave Sanford raised a number of questions with respect to the requirements summarized in N196, and stressed the importance of having an agreed, well documented set of requirements as a basis for the technical work.

Discuss comments against "Integration of Industrial Data for Exchange Access and Sharing: A Proposed Architecture"

Matthew West presented an overview of the contents of this document (WG10 N195) using slides as presented at the Beijing meeting (WG10 N210, updated version of N184).

The following issues were raised in discussion.

- Dave Sanford: Will the integration model and the associated integration methodology supercede the STEP Integrated Resources and integration/interpretation methods? This would be the case *if* ISO 10303 adopts the data integration architecture as the basis for a future version/release.
- Bernd Wenzel/Dave Sanford: It is not clear whether an integration method can always integrate different views, where these represent potentially very different business processes. Can it be *proved* that this capability exists (or can exist?)
- Dave Sanford: The intent of the integration architecture is not to align or integrate business processes; rather, it is to identify and integrate that information that *might* be used by these different processes.
- We need to understand the interdependencies, where they exist, between data and business processes.
- Julian Fowler: In the description of the different components of mapping, we need to discuss and agree definitions for the terms included in N195, explore examples, and agree whether these are really distinct and/or useful.
- Elaboration of the base concepts (slide 12) may be better described as *derived* concepts rather than *constrained* concepts
- Julian Fowler: We need to be careful in making comparisons between the data integration architecture and the (current/traditional) STEP approach. A key difference is that STEP does not "integrate" the results of the interpretation processes across multiple APs. Commonality is therefore more difficult to discover than the case where the results of the interpretation process (analogous to mapping in N195) are documented and registered centrally.
- Matthew West: The architecture needs to recognize that being a "base concept" is not absolute - it may be discovered to be derived from other *more* fundamental concepts, and this recognition may be critical to the integration process.
- David Price: One of the issues that arose from the Oslo meeting was whether the idea of "class" is really

fundamental. This lead to considerable discussion over the nature of class and classification. It was agreed that an improved definition is required. Dave Sanford suggested that a class is "a rule for determining the commonality amongst things".

- Dave Sanford: The use of the terms "object" and "class" needs to be explained as *not* being equivalent to the use of these terms in Object-Oriented analysis and programming.
- The foundation level concepts depicted on slide 13 are superceded by WG10 N197
- Slide 13 depicts some of the limitations of the EXPRESS language in the context of the proposed architecture. For example, everything represented by the entity data types (boxes) are classes; it is not possible to represent individuals in the same model.
- Julian Fowler: To understand the distinctions between the different aspects of mapping (subsetting, extension, projection, transformation, translation, encoding) it will be useful to see how these relate to a mapping between a simple application data model and the integration model using the current STEP mapping table notation.
- Dave Sanford: If application data models correspond to application software does it make sense to publish and standardize the mappings to these models?
- On slide 17, the boxes labelled as "Standard classes" and "Standard individual" should be relabelled as "Reference classes" and "Reference individuals".
- Julian Fowler: It is important to agree on the nature of the architecture and its components before determining how it is going to be standardized.
- The idea of the use of "registers" needs to be understood in the context of the ISO process, i.e., that they start from an approved, published international standard which is then updated and amended according to a published and approved revision procedure.
- There are many parallels and overlaps between the data integration architecture approach and that currently employed in STEP. There are advantages to emphasising the similarities, and to state that this is an evolution of the STEP architecture and methodology (just as modules are an evolution of APs). However, this needs to be balanced against the need to avoid deployment while the approach is not yet mature.
- Is there a need for a final PWI deliverable that precedes the submission of NWIs?
- The NWIs that may arise from the PWI may be distributed across several working groups.

Matthew West agreed to produce a revision of the N195 document, taking into account the issues and points noted above.

Action: Matthew West

Matthew suggested that issues should be distributed and discussed on the WG10 exploder. Dave Sanford offered to provide a Word template for an issues log.

Action: Julian Fowler to enter issues from this meeting into an issues log.

Action: All to submit issues via the WG10 exploder.

Walkthrough and review "Foundation for an Integration Model"

Matthew West presented a series of slides that walkthrough the EXPRESS-G integration model documented in WG10 N197. He explained that there are some terminology changes as compared to the overview included in WG10 N195 (e.g., **thing** rather than **object**, **link** rather than **relationship**). Dave Sanford asked whether it was worth going through the model at a detailed level rather than looking at worked examples of its use to achieve integration. Matthew proposed that the remainder of the first day should be spent looking at the model, and the morning of day 2 looking at usage examples.

Matthew explained the rationale for using temporal parts as a fundamental concept of the integration model. The intent of this approach is to model change. Bernd Wenzel asked whether examples could be provided to justify the statement that the use of temporal parts satisfies requirements that other modelling approaches cannot handle. Matthew cited the problem of Facility vs. Material in EPISTLE/AP221, and that of the installation of a particular jet engine as the port engine on a Boeing 777.

Considerable time was spent on explanation and discussion of the distinctions between associations, relationships, and links; in particular, the fact that there can be many relationships between a given pair of things, but only one link (which may be classified many times).

Dave Sanford suggested that it is important to add more detail to the EXPRESS representation of the integration model - for example, to redeclare end_1 and end_2 in class_member as classifier and classified, and to constrain classifier to be of type **class**.

Bernd Wenzel asked for clarification of the idea of temporal parts. Matthew West drew a diagram, reproduced in Figure 1 below, to illustrate this (using the aircraft engine example).

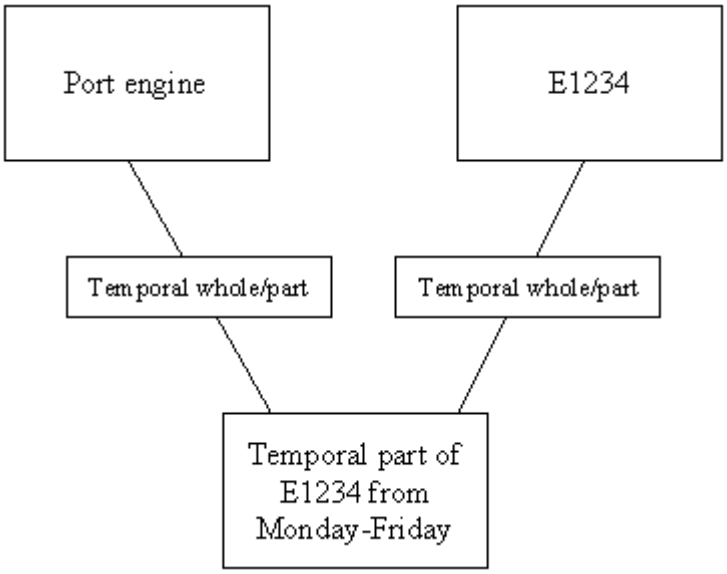


Figure 1: example of temporal parts

The issue of class, and its definition, were discussed further. Matthew West suggested that it is important to review not only the document under consideration, but also the literature upon which it is based.

The nature of activities and events was discussed, in the context of the distinction between occurrent and continuent.

Is as an aspect of an aspect an aspect of the whole?

Julian Fowler stated that there is a need to address further the issue of **encoded_information** - from past discussions, there may be some levels of detail that may not be present in the current model.

David Price asked whether lifecycle aspects apply to classes or to links. Matthew replied that links and classes are by definition timeless and therefore don't have lifecycles. There seems to be a problem with the idea of timelessness with respect (especially) to those classes that are defined solely by their membership.

The distinction between singular and plural objects was discussed. The example of a car, vs. the aggregate of its parts, was used. Matthew West suggested that the former is a singular object, and that the latter is plural. The plural object exists before the singular comes into existence, and after it ceases to exist.

Julian Fowler questioned whether it is necessary to explore and detail the ontological levels of sub-atomic particles, etc., in the scope of an activity fits within SC4 "industrial data". David Price stated that this would not be of interest to most of the parties active in SC4. Dave Sanford suggested that a general capability for composition is more important. Julian Fowler suggested that representing classes such as atom, molecule, etc. might over-emphasize their importance to the reader of the model. Dave Sanford suggested that it is inappropriate to include such enumerations at the fundamental level of the model. Matthew West countered that concepts such as atom and molecule are nonetheless fundamental. Julian Fowler suggested that this is dependent on a particular viewpoint: many models can be created and integrated without making use of these as fundamental concepts.

Dave Sanford noted that it should be clearly understood that the model addresses both meta-model and population concepts within a single scope.

End of first day

Progress review

Matthew West started the second day of the workshop by reviewing progress against the meeting agenda and goals. He suggested that three topics could be addressed:

- continue and complete walkthrough of the integration model
- review the metamodel and the notation used to describe it
- develop and review examples

but that time would permit only two of these to be accomplished. Matthew suggested that the best approach would be to defer completion of the integration model walkthrough. Bernd Wenzel suggested that many of the issues raised on the first day had related to definitions of terms such as "class". He suggested that he could present material originally discussed at the Chester meeting that could help to resolve these.

Matthew West suggested that further detailed review of the integration model might be better undertaken via the WG10 exploder, using the following format for the submission of issues.

- I don't understand why you say ...
- It seems to me that ...
- For example ...

Action: All to submit issues on N197 via the WG10 exploder, using this format

It was agreed to take Bernd Wenzel's presentation on terminology as the first item on the day's agenda.

Presentation: Introduction to Terminology

Bernd Wenzel introduced this presentation explaining that it had been prepared based on input from TC211. The presentation deals with the same issues as the data architecture work, but concentrates on terminology rather than data modelling. This presentation is available as WG10 N211.

It was agreed that the principles refered to in the presentation are both relevant and useful to the data architecture work. Discussion of the nature of classes was continued. Dave Sanford recalled his statement from the first day of the workshop that a class is the rule by which membership is determined (predicate). Julian Fowler quoted the definitions given in ISO/IEC 10746-2, which use "type" for the predicate and "class" for the set of members that satisfy the predicate:

> 9.7 Type (of an <X>): A predicate characterizing a collection of <X>s. An <X> is of the type, or satisfies the type, if the predicate holds for that <X>. A specification defines which of the terms it uses have types, i.e. are <X>s. In RM-ODP, types are needed for, at least, objects, interfaces and actions. The notion of type classifies the entities into categories, some of which may be of interest to the specifier (see the concept of class in 9.8).
>
> 9.8 Class (of <X>s): The set of all <X>s satisfying a type (see 9.7). The elements of the set are referred to as members of the class.
>
> NOTES
> 1 - A class may have no members.
> 2 - Whether the size of the set varies with time depends on the definition of the type.

The question of whether "class" and "set" are synonyms was discussed. It was agreed that great care must be taken to distinguish the extension of a class (i.e., all possible members) and some collection of members that are currently known. Bernd Wenzel recalled the idea of an "extensional class" as referred to in presentation WG10 N211. Matthew West suggested that there are classes of both "set" type and "predicate" type. Examples:

Class defined by type/predicate:
"the things on this table now"
Class defined by a set:
My pen, my computer, my coffee cup.

Dave Sanford stated that he prefered to restrict classes to things that have predicates, and that the enumerated case is where the set of members acts as the predicate, rather than itself being the class. By itself, a set of things may correspond to many classes - we don't necessarily know which one it is defining. It was agreed to move foreward with the idea that a class is the definition, or rule, or predicate, by which class membership is determined.

Integration Meta Model and Notation

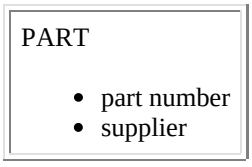
Matthew West presented a set of slides (WG10 N213) that explore the underlying metamodel or dictionary for the integration model. This introduces a graphical notation that attempts to overcome the limitations of EXPRESS and EXPRESS-G in that the notation shows classes and individuals in a single model. Possible implications for the further development of EXPRESS were discussed.

The representations of links and link_ends in Meta-Model V2 was discussed. It was agreed that a Link is something that has two (or more, allowing for n-ary relations) link ends. Günter Staub asked whether a link could be neither individual nor a class. Matthew responded that this was not possible: indeed, the root concept object or thing is effectively ABSTRACT - every thing is either a class or an individual. This need not be modelled formally as ABSTRACT, since it may necessary to record the existence of something before it is discovered whether it is a class or an individual.

Matthew explained that in the Meta-Model V2 diagram the solid boxes represent those parts of the model that could be directly implemented as tables in a relational database such as MS Access. The dotted boxes could be implemented as Views on these tables.

Worked example(s)

Julian Fowler suggested that we should start with an apparently very simple external model and ezamine how this maps into the intergration model as proposed by Matthew West. The proposed external/application data model is as follows:



The analogy to the STEP interpretation process was discussed and explored. Julian Fowler suggested that there is a key difference, in that there is no single "integration model" for STEP - each AIM specifies the usage of a subset of the integrated resources for a given context. Dave Sanford characterized this as the interaction between the data specification and the business process that exploits the data. In the data integration integration architecture, is the context information held in the integration model or in the mappings?

Julian Fowler outlined the stages of the interpretation process:

- analysis
- concept mapping
- construct selection
- construct specialization
    - definitional
    - population constraint
    - referential constraint
- construction
    - AIM schema
    - mapping table

A key difference between the STEP approach and the proposed data integration architecture was noted. In STEP, a fundamental principle is that generic concepts/constructs in the integrated resources can be used in different ways to meet differing requirements, where each usage is a specialization or restriction on the generic idea. These specific usages are *not* then incorporated into a single integration model. As aspect of the AP integration/AP modularization work is the recognition and subsequent publication/registration of reusable interpretations. STEP nonetheless preserves a two-model architecture: IRs which are context independent (at least within the scope of product data), and AIMs which are dependent on and specific to a context (and therefore to a business process).

Nonetheless there is also a strong overlap in approaches in that the STEP methodology requires extension at the IR level as and when the interpretation process addresses requirements that are not satisfied. However, the IRs will be extended at a generic level, not with a concept/construct that is specific for the AP from which the void has been discovered.

Figure 2 below was developed to illustrate the mapping of the "ARM" model fragment to an AIM. Elements of the AIM EXPRESS-G diagram in black are those that are selected (copied) from the integrated resources. Those in red are constructs or constraints that are specific to the AIM.

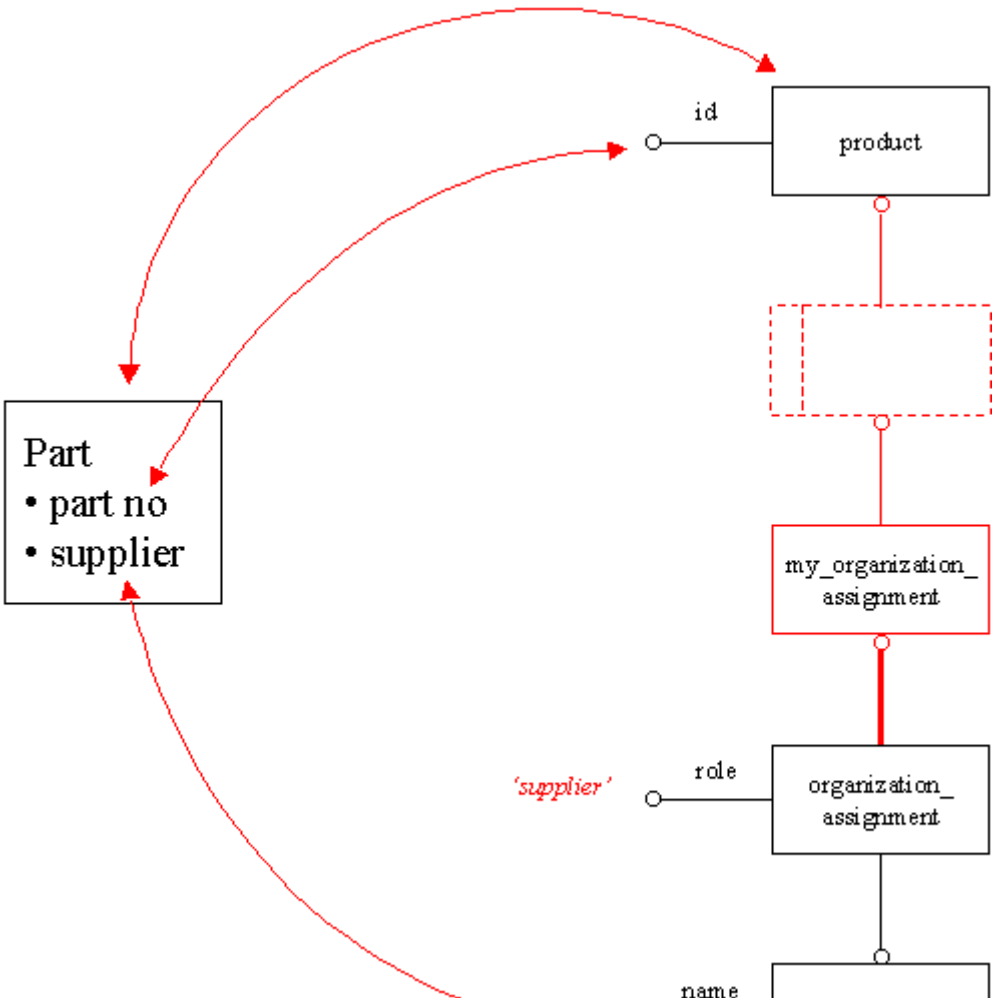


Figure 2 - sample STEP interpretation mapping

Considerable discussion followed on issues resulting from the question of what happens if this AIM schema is to be integrated with another AIM schema with which there is an overlap - either structural or semantic. Several participants made the point that there is no explicit integration model in STEP, and that the STEP interpretation methodology is not designed to achieve such a model. The discussion focused on how to identify and represent the context in which a given data model (and therefore instances) are valid. Dave Sanford suggested that the following conclusion had been reached: it is, or should be, possible to take the various elements of an AP (scope, AAM, ARM, mapping table, AIM) and map all of them into the single integration model. Bernd Wenzel suggested that this implied that part of the integration model is a taxonomy of contexts. Matthew West suggested that these contexts appear within the mappings to different external/application models.

Matthew West then constructed a subset of an integration model corresponding to the same example, as shown in figure 3 below. This also illustrates the creation of an application view, which uses the terminology of the integration model in the structure of the application data model ("ARM").

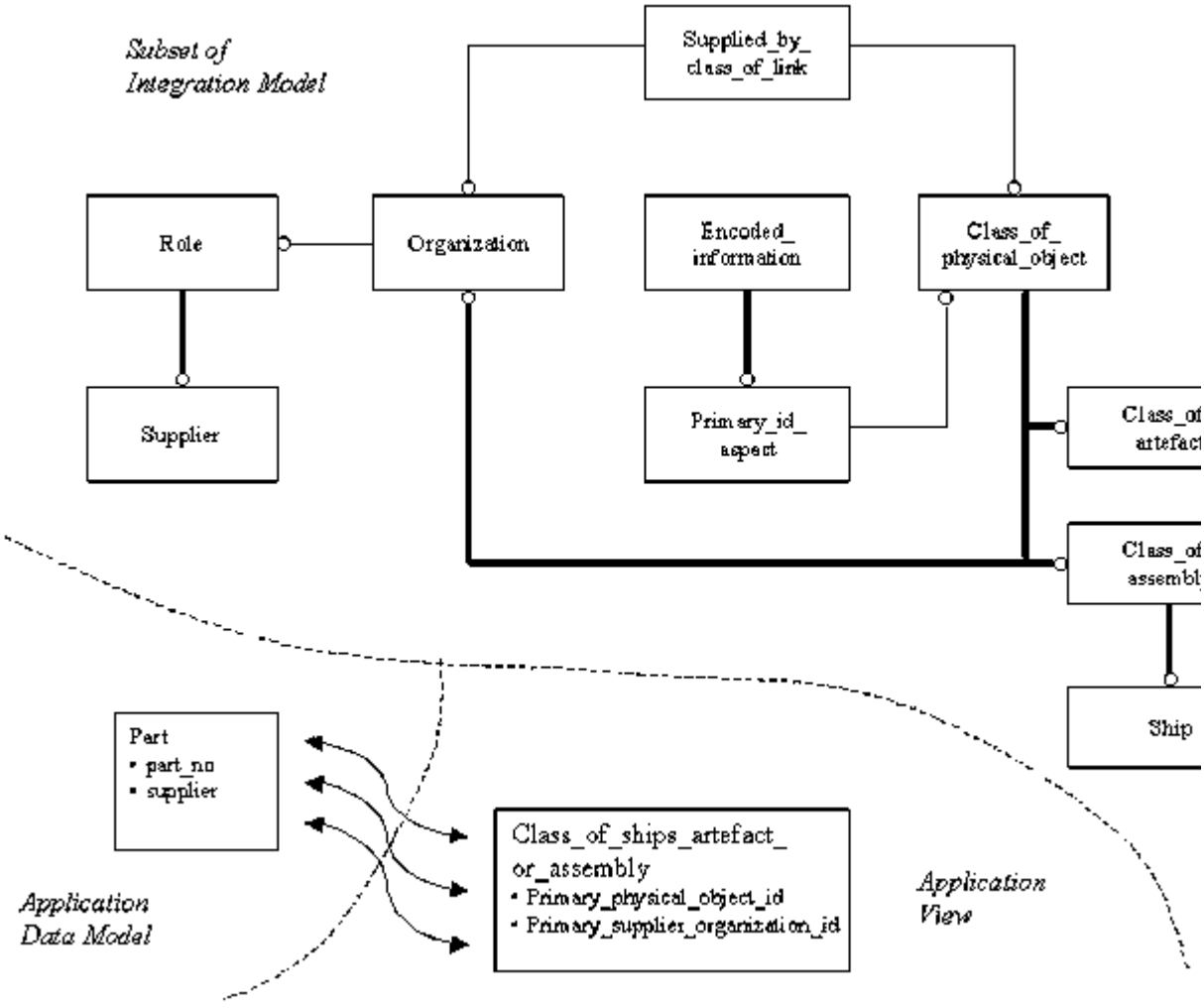


Figure 3 - mapping to subset of integration model

David Price suggested that there is a limit to the usefulness of comparisons to current STEP methodology, until there is much greater certainty and understanding with respect to the data integration architecture, and its impact on the SC4 standards.

Plan and discuss the demonstration of the architecture

The development of a demonstration based on the results of the PWI was discussed. Matthew West noted that this had also been discussed at both the London (May) and Oslo (August) workshops, actions had been assigned, and yet progress had been very slow. Jochen Haenisch stated that DNV is still interested in working on a demonstration in the domain of ship structures and the overlap between AP218 and ISO 15926. He noted that his understanding of the integration model had improved since the Oslo meeting, and that this would make initiation of a demonstration activity easier. David Price expressed a concern that the London workshop had established as a requirement for the demonstration a stable integration model. Each meeting since then has resulted in very different models (that produced by Julian Fowler before the Oslo meeting, the model developed at the Oslo meeting, and the model presented by Matthew West at this meeting). Matthew West suggested that the demonstration should take the current (N197) as a baseline and work forward from there.

Julian Fowler stated that he would try to document the integration methodology, using a description of the STEP interpretation and integration methods as a starting point. Matthew West offered to review this document once available.

A sequence of tasks to be carried out was identified, as follows.

Task	Resource(s)	Target date for completion
Extend integration model	Matthew West	1998-12-31
Produce description of integration methodology	Julian Fowler	1998-12-31
Integrate sample models and develop mappings	David Price (AP203) Jochen Haenisch (ships)	1999-03-31

Günter Staub and David Price both stated that using EXPRESS-X to create mappings to "EPISTLE" style models is very complex. Günter Staub suggested that the STEP mapping table syntax may be more suited to some aspects of the problem. David Price stated that PDES, Inc. and ProSTEP can supply sample data sets in the AP203/PDM domain.

Based on the actions and schedules described above it was agreed that there will be a useful "checkpoint" at the San Francisco meeting. It was found to be difficult to schedule a meeting to address this. It was therefore agreed to carry out the bulk of the review by email and/or conference call, with a short coordination meeting to be held 0900-1000 on the Thursday of the San Francisco meeting.

Action: Bernd Wenzel to request meeting room

Jochen Haenisch agreed to act as task leader for the demonstration activity.

David Price recalled that it had been agreed at the London meeting in May that the demonstration activity would require 6-12 months to complete. Matthew West noted that in spite of the delays the activity is therefore roughly on schedule. It would be nice to have a practical implementation/demonstration to show at the Lillehammer meeting in June 1999.

Update project plan, schedule, resources, and task leaders

The PWI project plan, a summary of which is included in the WG10 workplan (WG10 N187) was reviewed and updated.

It was agreed that it is necessary to maintain formal issues logs for the documents that are being developed in the PWI project. Dave Sanford offered to supply an MS-Word template. David Price stated that he was planning to develop a web-based issue collection and distribution mechanism for the STEP Modularization project. It was agreed that Matthew West and Julian Fowler would review available methods for gathering and publishing issues and implement this before the San Francisco meeting.

Action: Matthew West, Julian Fowler

Matthew West stated that the Produce Technical Overview task is on schedule (current draft, WG10 N195). David Price asked that the scope of this deliverable should be expanded to include a description of the integration methodology.

Schedules for the demonstration tasks were adjusted as discussed previously and reported above.

As previously discussed, the EXPRESS/EXPRESS-X requirements task has been delayed.

Tasks were added to develop a final PWI report to SC4.

Action: Matthew West to publish revised project plan

End of second day

Remaining tasks

Matthew West suggested the final session of the workshop should address the following topics:

- complete walkthrough of the integration model (WG10 N197)
- integrating the results of the Oslo workshop with N197
- Next steps and assignment of actions
- Requirements for future meetings
- Any other business

This revision to the agenda was agreed.

Complete walkthrough of the integration model

Matthew West resumed the walkthrough of the integration model, starting at slide 6 of presentation WG10 N212. Bernd Wenzel questioned the use of the term "artefact", suggesting that its use in the model differs from that given in a dictionary. Matthew responded that "simple artefact" might be a better name. Dave Sanford asked whether the modelling of assemblies and artefacts represented an altenative way of modelling bills of materials. Matthew explained that the basis for these ontological level is identity: something is an assembly if it has parts, something is an artefact if it has a purpose, something is a topological piece if it is internally connected, etc.

Dave Sanford pointed out that several of the definitions given in WG10 N197 are incomplete and/or ambiguous. Bernd Wenzel used the example of a laptop computer to explore the concepts in the material level. What happens if the disk drive is removed and the CD drive inserted? Matthew responded that the computer still exists (identity as an assembly) but has a different composition. This relates to the idea of "essential material continuity" that is part of the definition of physical_object. Matthew stressed that there is a different between *identity* and *identification*.

Bernd Wenzel suggested that the term "assembly" as used here is different from that common used in SC4, and that an alternative form should therefore be found. Dave Sanford suggested that the subject here is already addressed by existing models within SC4. Bernd Wenzel stated that he understood the use of spatio-temporal parts up to the level of artefact, but had encountered problems with this approach in what industry calls an

assembly. Matthew asked Bernd to provide details of this concern by email.

Action: Bernd Wenzel

Dave Sanford pointed out that the inclusion of organism and animal as shown in slide 6 is not correct: these are based on different classification bases. Matthew pointed out that the relationships in the different ontological levels is one of aspects. For example, an artefact has an aspect that is a morphological piece (shape). Positioning of organism in this hierarchy is not certain.

On slide 7, the nature of property was discussed. Günter Staub questioned the statement that a property is a class. David Price asked what the relationship of the approach is that that in the POSC/CAESAR (ISO 15926) model. Julian Fowler suggested that it is more intuitive to pursue the idea of a property or characteristic as an aspect of something, rather than as a class that the thing belongs to. This led to a discussion of the relationship to descriptions of properties, units of measures, etc. Julian Fowler suggested (and Matthew West agreed) that the class of a property is most useful in determining the appropriate and/or correct descriptions of the property, rather than the essential nature of the property itself.

On slide 8, some of the terminology used was questioned. Julian Fowler asked whether the use of "connection" corresponds to common (industrial) usage of this term.

In concluding this segment of the workshop, Bernd Wenzel requested that Matthew West provide more justification for the choices that have been made in the creation of the integration model. This is necessary to wider understanding of the integration model, its review and improvement, and its explanation to those outside the PWI project team. Matthew agreed to do this, and asked the team to provide input in the form of questions and issues that will help to strengthen the documentation of the model. Dave Sanford suggested that the current use of EXPRESS-G diagrams is a limitation, given that it is recognized that it cannot handle all the concepts of the model.

Integrating the results of the Oslo workshop with N197

The model resulting from the Oslo workshop was reviewed. The EXPRESS-G diagrams are reproduced below as figures 4 and 5.

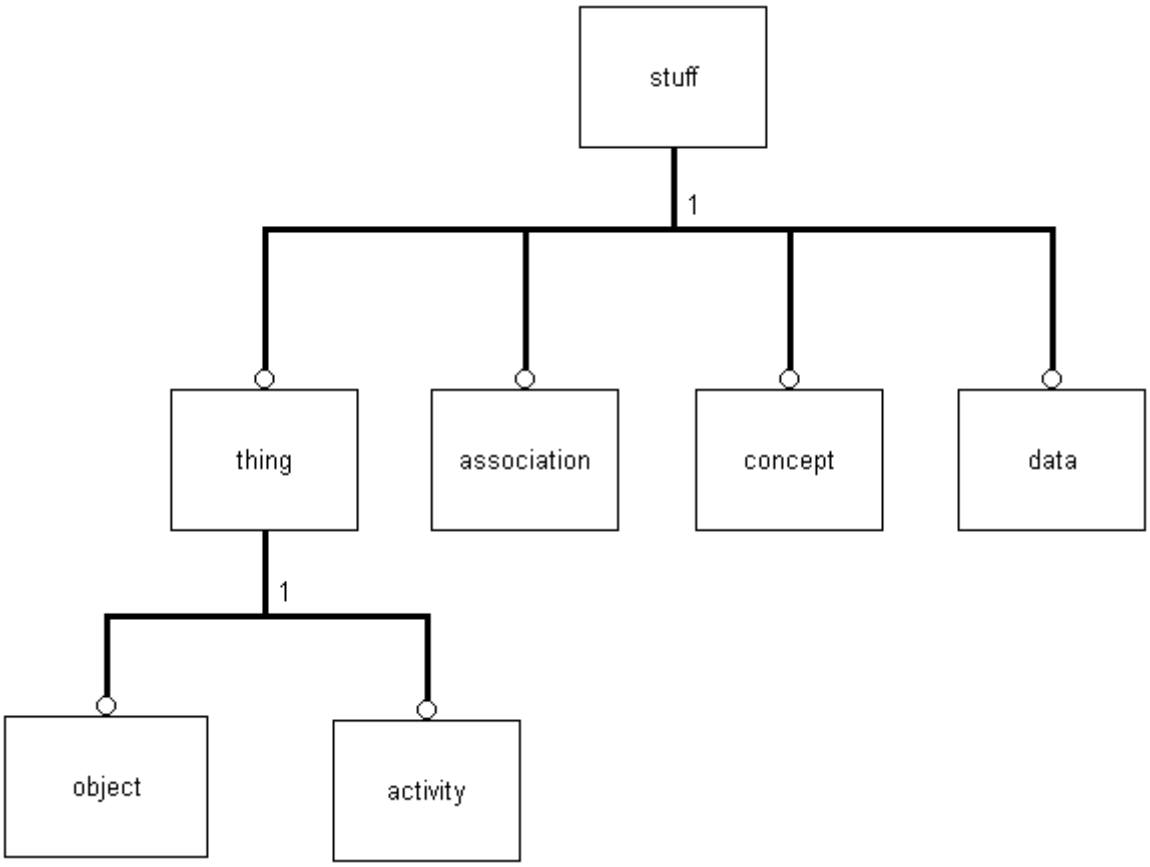


Figure 4: reworked integration model - top level entity data types (Oslo figure 2)

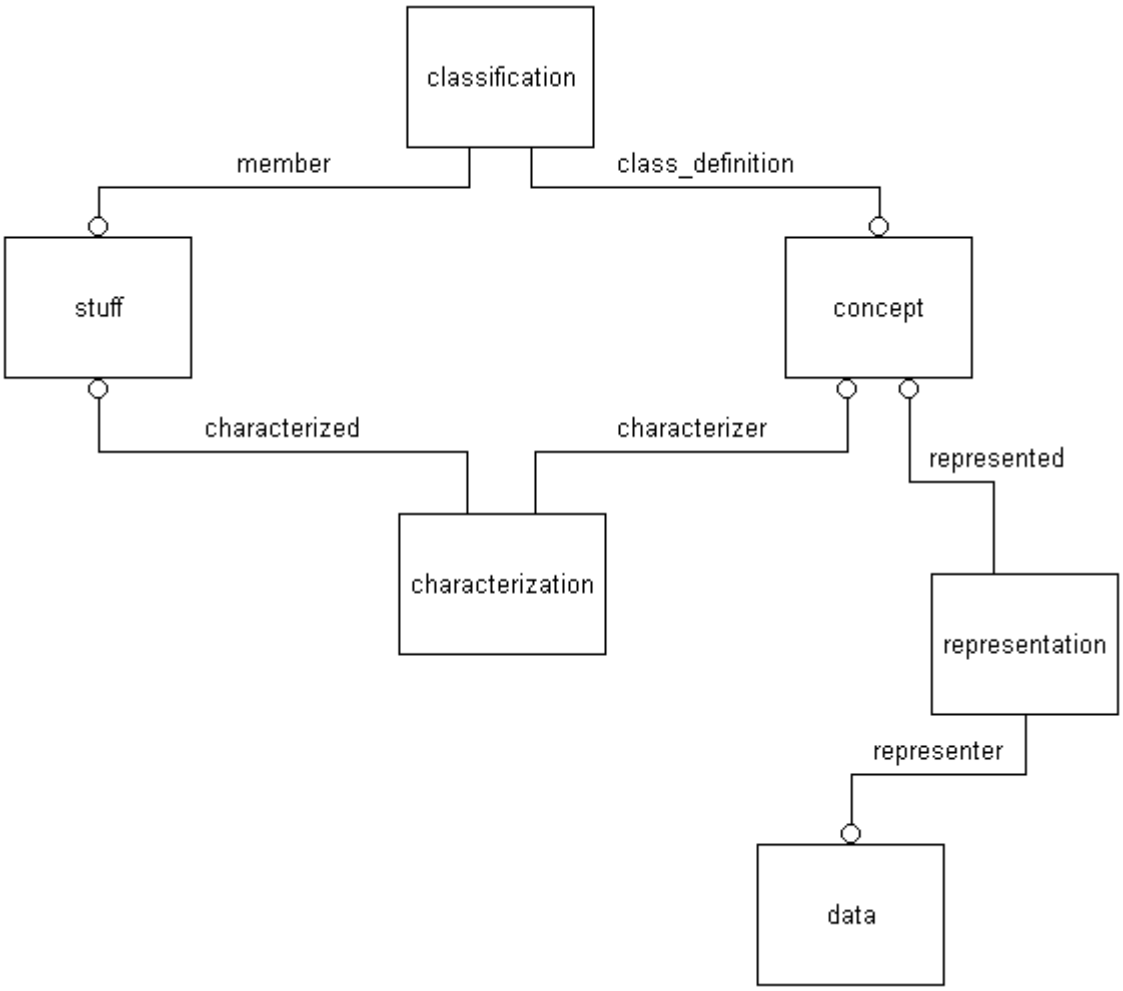


Figure 5: reworked integration model - some associations (Oslo figure 3)

Bernd Wenzel provided a summary of the discussions in Oslo that had given rise to this model. He also introduced some possible changes that he had identified after the Oslo meeting - making data a subtype of thing, adding event as a subtype of thing, adding link and link end as subtypes of concept, and (re)introducing class as a subtype of concept. This revised model is appended to these minutes in PowerPoint and Adobe Acrobat formats.

It was emphasized that the work at Oslo had been related to approaches such as NIAM's distinction between lexical and non-lexical objects. Matthew West suggested that most of the concepts are common to the two models, with the following two differences:

- links as a subtype of concept (common supertype of link and class)
- typical as subtype of class rather than individual

These differences need to be documented and raised as issues.

Julian Fowler reproduced the following diagram to illustrate the distinction between the "real" world and its representation (as signs or data) within information systems.

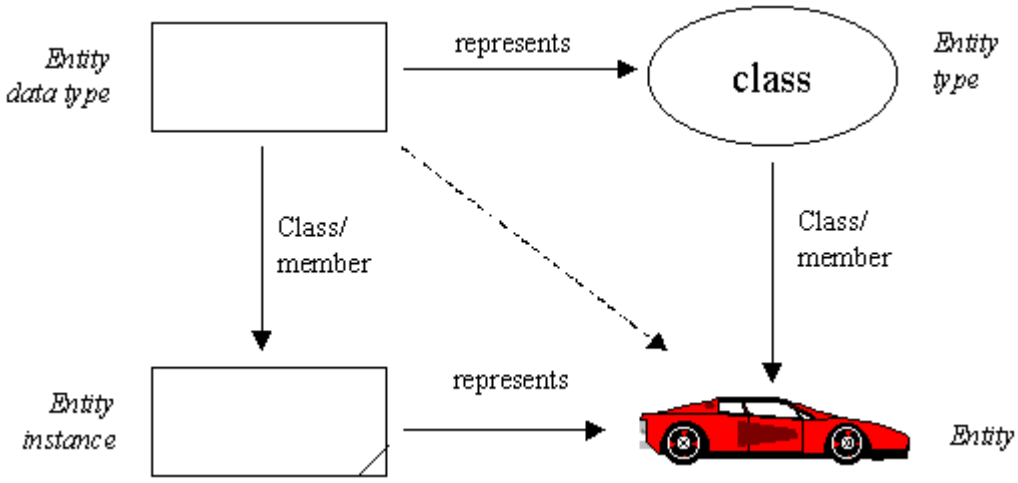


Figure 6 - "real" world vs. information

Julian explained that the right hand side of the diagram represents the "real" world, while the left hand side represents representation of the real world in information systems. We often assume that there is a relationship (shown dotted on the diagram) between entity data types in information systems and real world entities or things. It has to be recognized that this is a combination of both "class-member" and "representation" relationships. Günter Staub pointed out that there is also a valid "represents" relationship between entity instance and class.

Next steps and assignment of actions

Julian Fowler summarized the actions assigned during the meeting. Actions are documented separately in a PWI Actions Log (WG10 N215).

Requirements for future meetings

It was agreed that there will be a WG10 meeting between the San Francisco meeting in January 1999 and the Lillehammer meeting in June 1999. The Data Architecture PWI project will meet at Shell Centre, London from Wednesday April 21 to Friday April 23. The STEP Modularization PWI project may meet at the start of the same week.

Close

All participants thanked David Price and PDES, Inc. for hosting the meeting. The meeting closed at 1200.

Respectfully submitted
Julian Fowler
1998-11-23

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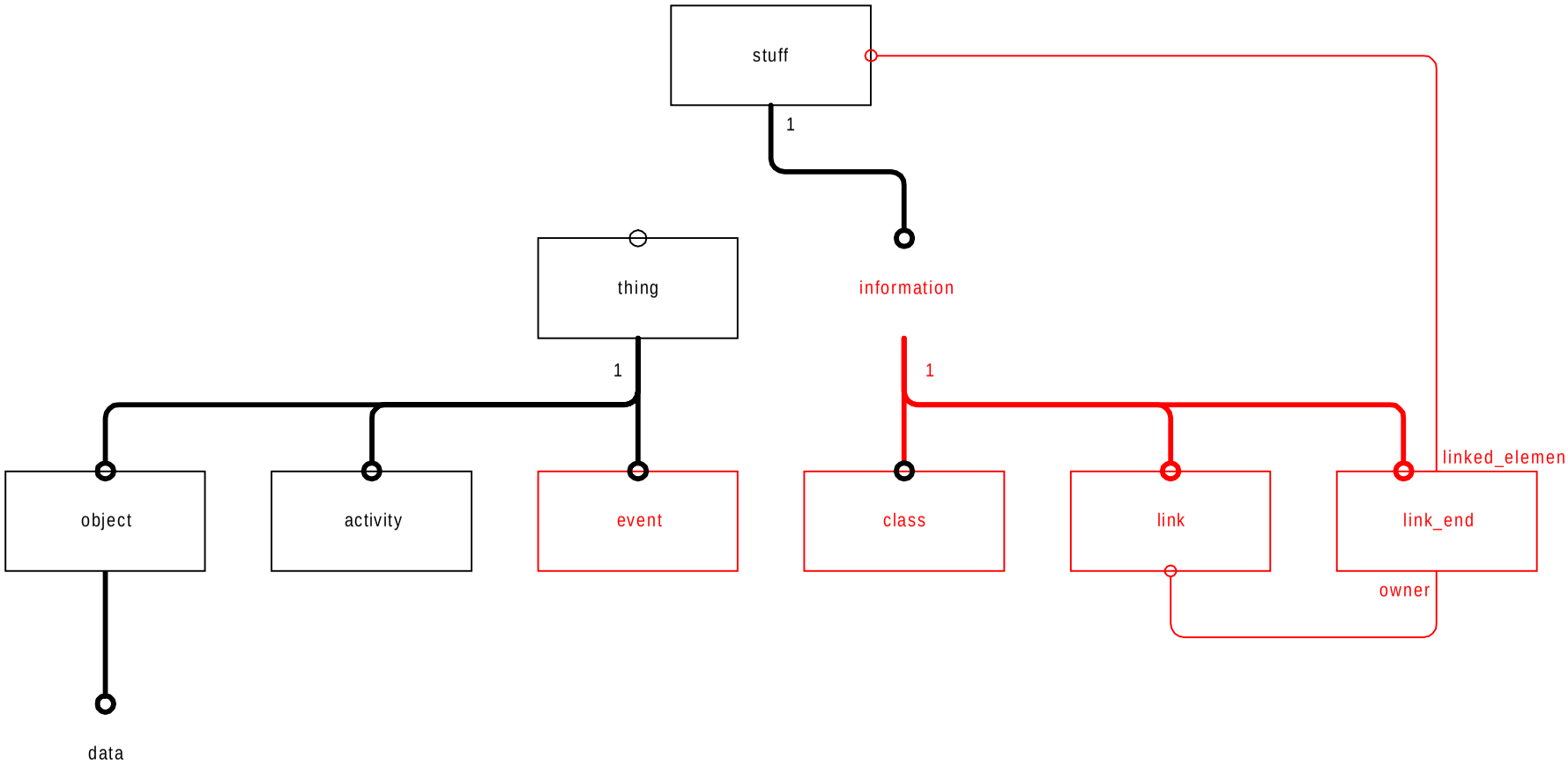
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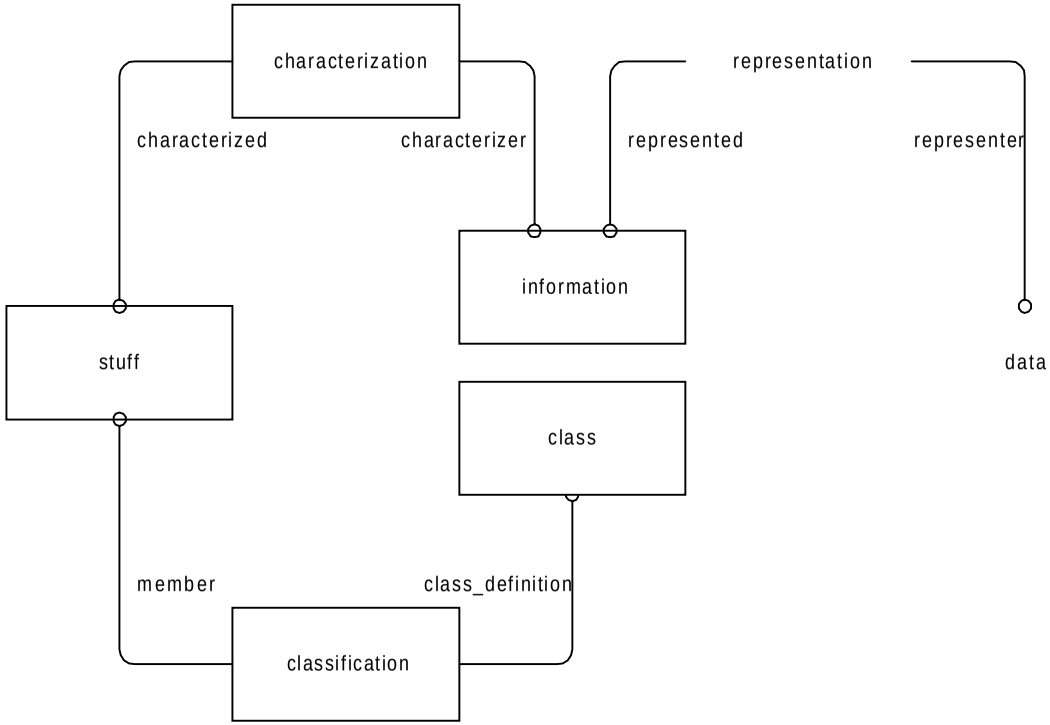
characterization
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